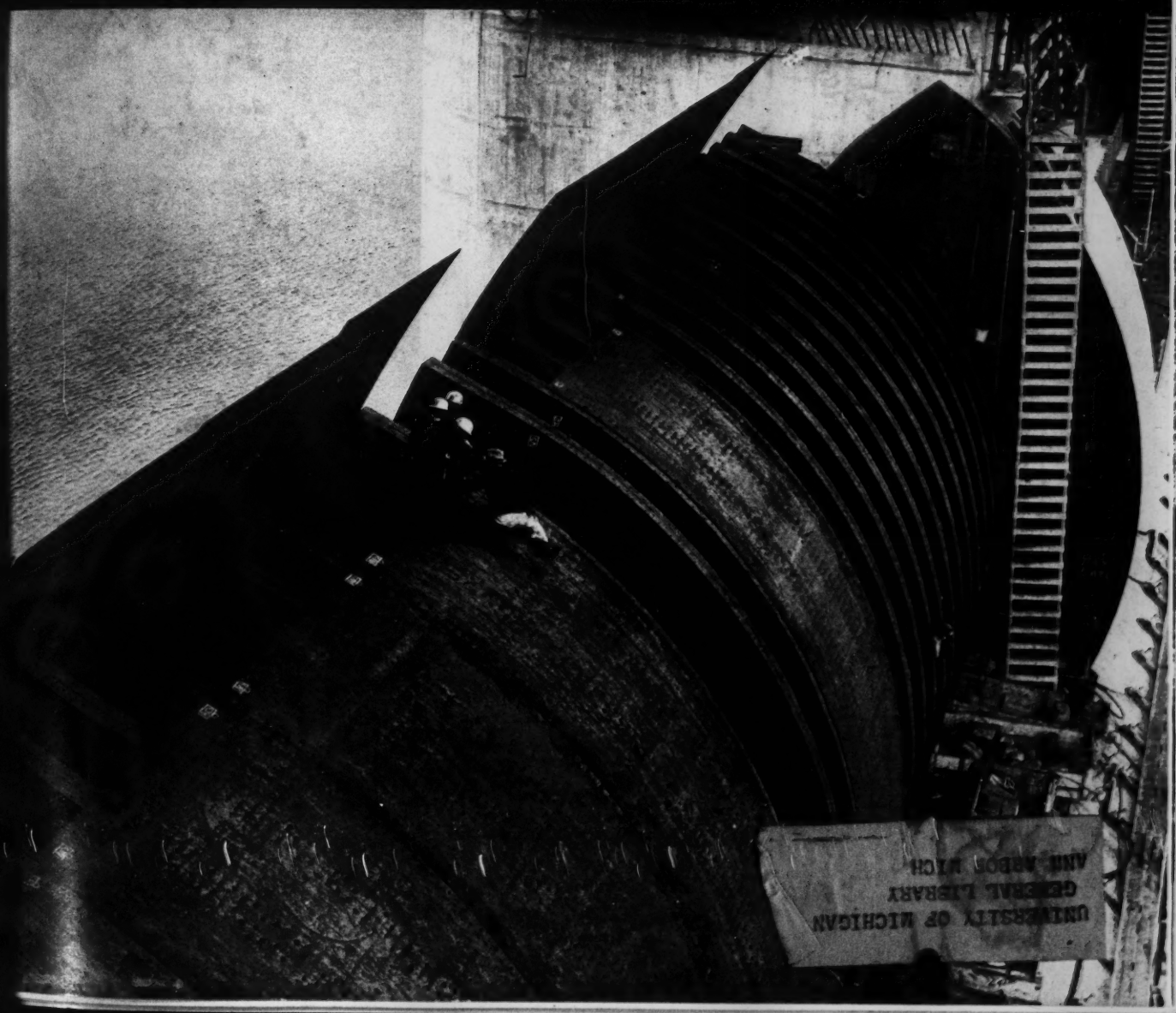
ENGINEERING NEWS-RECORD

en drum gates at Grand Coulee Dam to provide a movable spillway 1,485 ft. long—*See page 4*



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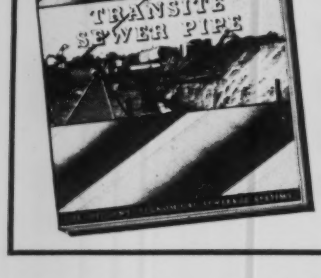

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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • FEBRUARY 6, 1941

Roadbuilders express concern over lag in defense road work

Federal Works Agency sharply criticized for its failure to press for greater speed in building key sections of the strategic highway network

Failure of the federal government to make plans for immediate elimination of the bottlenecks in its strategic highway network and the complacency of the Federal Works Agency, which is now charged with keeping Congress informed as to the highway needs of the country, with regard to the present unsatisfactory condition of the strategic highway network, brought forth frequent criticism and much pointed comment during the closing days of the annual convention of the American Road Builders Association in New York Jan. 27-31. John M. Carmody, Administrator of the FWA, drew most of the fire because of views expressed in the statement which he prepared for the opening session of the convention. In that statement Mr. Carmody said that the construction of access roads to military camps and to industries that are being expanded to meet defense orders is a matter calling for immediate action but that the improvement of express highways through cities and the construction of bypasses around towns is not something to be pressed for as a matter of national defense. He said that there is too limited a supply of men and materials at the present time to undertake such work.

The first questioning of this attitude came from E. Donald Sterner, commissioner of the New Jersey State Highway Department, who pointed to the serious congestion existing on all major highways along the North Atlantic seaboard, congestion which grows more serious every day, and which would seriously handicap the movement of mechanized army units into and through that area for its defense. "If invasion is not a factor," said Mr. Sterner, "why build a big mechanized army, and if it is a factor, why not undertake the immediate construction of the airports and roads needed to resist invasion effectively?"

Like views were expressed by Willard Chevalier, publisher, *Business Week*, and a past president of the A.R.B.A., at the annual banquet of the association, but Mr. Chevalier carried his condemnation of this attitude further by pointing out that the only conclusion to be drawn from the Administration's lack of interest in the construction of the roads that are required to protect our shores from invasion is that the mechanized army is being raised not for the defense of this country, as the Administration claims, but for service abroad.

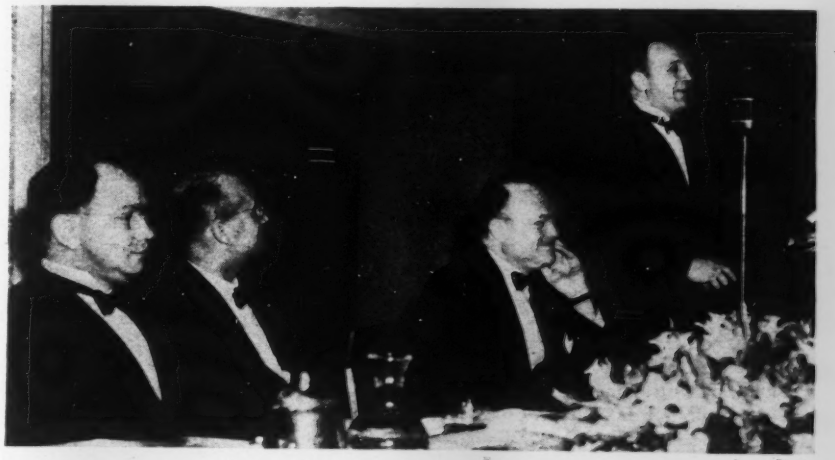
Seacoast defense

Murray D. Van Wagoner, governor of Michigan, another past president of the A.R.B.A., in his talk to the annual banquet, also urged an early start on the much-needed strategic highways along our seaboards. The governor said that people in the Middle West were not aware of the gravity of the situation with regard to defense highways along our Atlantic seaboard.

Further emphasis on the need for great expansion of the highway network along the Atlantic Seaboard was given by Arthur W. Brandt, superintendent of public works, New York state department of public works. Mr. Brandt also pointed to the deficiencies of the present highway system for meeting civilian needs and to its complete inadequacy for military needs in case of invasion.

Robert Lee Bobbitt, Texas highway commission, took exception to the statement Mayor LaGuardia made at the opening session to the effect that road programs should not be tied to the defense program. Pointing to the close relationship between civilian and defense needs, he said that in his state alone ten years would be required to bring the highway system up to the standards called for by the army unless the federal

(*Continued on page 10*)



Acme Photo

Roadbuilders hear Michigan's governor

Gov. Murray D. Van Wagoner, of Michigan, past president of the A.R.B.A., gets a laugh from the big crowd at the annual banquet when he tells them it was not personal ambition that led him to run for governor but his desire to keep the state highway department out of the hands of politicians. To the right of the Governor are: Hal G. Sours, president, A.R.B.A.; R. M. Smith, deputy minister, department of highways, Toronto, Ontario; Armando Santa Cruz, assistant secretary of public works in Mexico.

Army may support defense road fund

Chief of Engineers believes department favors new road appropriation

The War Department, in the opinion of Major General J. L. Schley, Chief of Engineers, will support before Congress the budget estimate soon to be presented for road funds, additional to regular federal aid, to meet defense highway needs. The general expressed this view in a letter to Rep. Carl Hinshaw of California; Hinshaw had inquired whether there was anything the department could do about the problem of providing highway facilities for the expanded Lockheed Aircraft plant.

In reply, General Schley pointed out that, for the present, federal participation in roads other than those on military reservations is being handled exclusively through the regular federal aid channels and the WPA. He then drew the Congressman's attention to the following passage in an editorial appearing in *Engineering News-Record* for Jan. 16, 1941: 'Sound policy would appear to call for the immediate appropriation by Congress of sufficient money to build the camp access roads. Added to this should be a separate fund which could be used by the Public Roads Administration to supplement expenditures by states, counties or cities for roads to serve war industries.'

"While the matter of allocating funds for such improvements is not within my province," said the general, "I shall be glad to advise the War Department as to the importance of this need, and have no doubt that the Public Roads Administration will receive full support from the War Department in presenting this matter to Congress."

War Department wary

Historically, the War Department has never been willing to go on record as to the defense value of any particular road project. The strategic network is the nearest approach, and even this has been handled in a very generalized and cautious way. This attitude has often proved embarrassing to Congressmen urging the military utility of highway expenditures, since the Army has not seen fit to back them up.

General Schley's prediction that this policy would be changed as regards the expected appropriation bill is not strictly a statement of departmental views, since the Chief of Engineers is not authorized to speak with authority on highway matters (which come under G-4 of the General Staff). The Hinshaw letter is a personal expression of the general, but he may safely be assumed to be in close touch with departmental thinking and plans.

It is not yet known how large an amount the President will ask Congress to provide for defense roads. Its use will doubtless be restricted roads immediately required for access to military cantonments and to new or enlarged factories working on defense orders—none for improvements to the strategic network and certainly none for municipal bypasses and superhighways.

The access roads themselves, however, will be no dirt tracks. In many cases, where they are providing nearly the entire transport for communities of 20,000 or 30,000, they will be high-type four-lane divided parkways. They will have to be built fast and may create almost as much strain in the highway field as the cantonment program has in general contracting and carpentry.

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Sabotage safeguards for Washington water supply

Sabotage and water service received the attention of Washington legislators last week when the House Appropriations Committee was asked to give early attention to a request for $75,000 for safeguarding the Capitol's water supply. The money would be used to make changes in a hydroelectric plant so that it could be converted into a pumping station to lift raw water from the C&O Canal into the District of Columbia's Dalecarlia reservoir.

Dalecarlia reservoir is normally fed by twin conduits which tap the Potomac River at Great Falls, some 10 mi. away. The District Commissioners urge that immediate action be taken to supplement this supply with emergency connections to the C&O Canal and the installation of pumps at the hydroelectric works.

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New road proposal to cost Ark. $20,000 per year

A bill providing for state maintenance of highway continuations through cities and towns has passed both houses of the Arkansas legislature and now goes to the Governor for approval or disapproval.

Such maintenance now is available only through towns of less than 2,500 population.

Under the bill, the Arkansas Highway Commission could supersede a city council's authority in designating a highway route. The commission would be authorized, with consent of federal authorities, to change state highway designations by filing an official route map for public record.

It is estimated that 200 mi. of continuations are affected, and the new maintenance cost would be $20,000 a year.

WASHINGTON HIGHLIGHTS

FEDERAL aid to engineering research at state colleges would be authorized by a bill introduced by Rep. Green of Florida. A similar bill was introduced last year but got nowhere, largely as a result of disagreement among the various groups interested in it. It is said that these disagreements have now been straightened out and the bill is given a good chance. Under the bill, the federal government would make an outright grant of $25,000 a year to one college in each state and would also match local contributions up to an additional $25,000. The land-grant college in each state would receive the money if it had an engineering experiment station, otherwise whatever state-supported college was designated by the state legislature. The plan would be administered by the Secretary of the Interior.

THE INDEPENDENT Offices Appropriation Bill is pushing its way through Congress with practically no change from the budget figures (ENR, Jan. 9, 1941, p. 57). Only substantial cuts were made where it doesn't make any difference—in appropriations for payments on federal aid roads and on USHA annual contributions to housing projects. In both these cases, the money is to meet federal obligations when they come due; the reduction merely means that the House Appropriations committee thinks the budget has overestimated the amount which will come due during the fiscal year. If the budget is right, a deficiency appropriation will have to be passed.

GENERAL SOMERVELL has asked the comptroller general for permission to increase the payments to contractors holding lump-sum contracts from the Quartermaster Corps in cases where the prevailing level of wages has risen. The great demand for labor on the cantonment program has tended to force wages up. On the cost-plus jobs, the Department of Labor has in many cases certified higher wages as prevailing after the job started.

THE $45,000,000 Santee-Cooper hydro power project in South Carolina has been designated by the office of production management as a "necessity to the national defense." Director Knudsen has urged Works Administrator Carmody to push the project to completion as quickly as possible; of its potential capacity of 133,000 kw. some 30,000 kw. is needed by the Aluminum Co. and another 50,000 kw. is needed by Commonwealth and Southern.

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"Bloodless civil war" to be waged against A.V.A.

Colorado's Governor Ralph L. Carr issued invitations, Feb. 1, to the governors and water officials of sixteen other western states, to join him in "a bloodless civil war" against the proposal to establish an Arkansas Valley Authority (similar to TVA). Governor Carr, who has been interested in water development and irrigation for a quarter of a century, asked the officials to meet in Denver Feb. 7, to organize for the fight. "Alternate solutions must be worked out for presentation to Congress," said Governor Carr, stating that the major purpose of the meeting would be to work out a defense against the A.V.A. plan and against the threat of federal control of all western water, which was made possible by a recent U. S. Supreme Court decision. He was referring to the decision in the New River case, which held that any river which "would float a 2-ft. rowboat when dammed" was navigable and thus subject to federal control.

The A.V.A. plan was recently introduced in Congress and proposes an Arkansas Valley "power yardstick" under a three-man directorate which would take over all dams and reservoirs of the White, St. Francis, Arkansas and Red Rivers in eight states, involving 308,165 sq.mi. States involved are Colorado, New Mexico, Oklahoma, Texas, Arkansas, Louisiana, Kansas and Missouri.

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Civilian aids appointed in new Army zone setup

Following the decentralization of the Quartermaster Corp's construction division by the appointment of nine zone officers (*ENR*, Jan. 9, 1941, p. 63), a standard organization for each zone office has been adopted. Each office will be divided into three departments, engineering, administration and operations —which will be headed by civilians. Each engineering department will be headed by an engineer, and an architect will be associated with him. The operations departments, which are responsible for overseeing the progress of construction on jobs in the zone, will be in the charge of an experienced contractor. Administration will be headed by a civilian with outstanding administrative experience.

These civilian chiefs are in no sense advisers, but are members of the zone officer's staff with definite responsibility. Men have been selected to fill these posts, but no names have yet been formally announced by the Quartermaster Corps.

Howson nominated for A.W.W.A. presidency

Louis R. Howson, consulting engineer of Chicago, has been nominated for the presidency of the American Water Works Association by the nominating committee of the association. Abel Wolman, professor of sanitary engineering, The Johns Hopkins University, was selected for the vice presidency, and William W. Brush, editor of *Water Works Engineering*, has been chosen for the treasurer's office. If no other names are filed by March 1 the nominees will be considered elected.

Harry E. Jordan, secretary of the association, who made this announcement also stated that at the annual meeting of the board of directors honorary memberships were voted to J. Walker Ackerman, retired chief engineer of the water department of Utica, N. Y.; to R. C. Harris, commissioner of works at Toronto; and to Frank C. Jordan, secretary of the Indianapolis Water Co.

The directors also awarded the Diven medal for 1941 to William W. Hurlbut of Los Angeles, for his successful leadership of the steel pipe committee. Paul Wier of Atlanta was awarded the Goodell prize (given by *Engineering News-Record* in memory of a former editor) for his research on the effect of internal pipe linings on water quality.

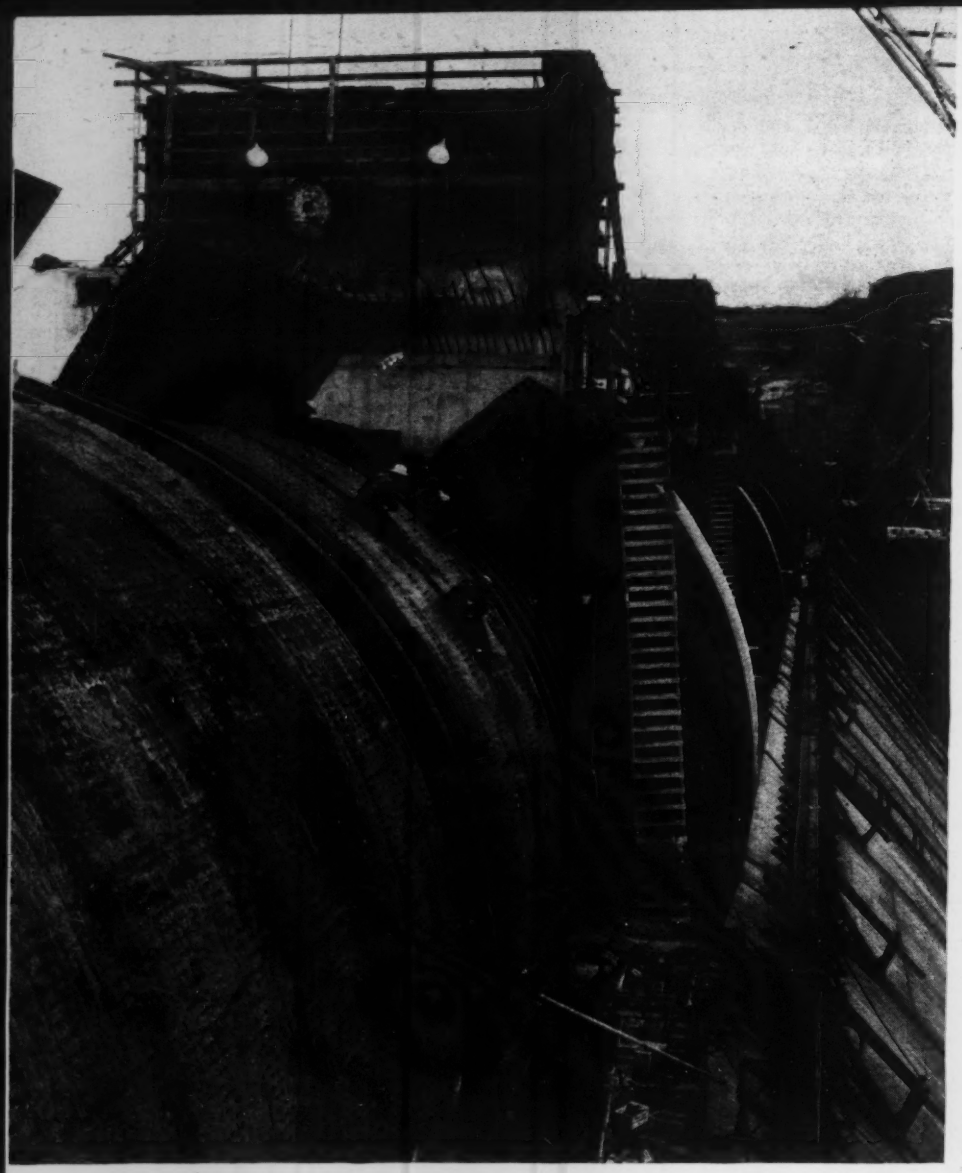
Ready to control destructive Orange County flood waters

For flood control on the Santa Ana River in Orange County, Calif., Prado Dam, a rolled earthfill 105 ft. high and 2,280 ft. long will store 224,000 acre-ft. The inlet channel to the control tower is shown in the foreground, and the spillway with its lined channel and bucket appear at the opposite end.

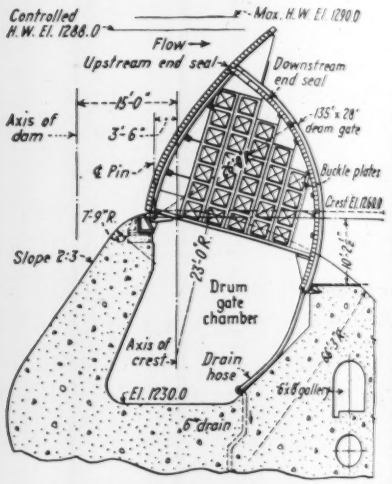
The dam, which is part of a comprehensive program of flood control in Orange County, has been constructed under the direction of the Los Angeles district office of the Corps of Engineers. Contract has been carried out by Prado Constructors, a bidding combination composed of W. E. Callahan Construction Co. and Guthrie, Marsch & Peterson Co.

Eleven drum gat

To insure proper control of the Columbia River at Grand Coulee Dam during construction as well as in operation after completion, outlets are provided with a total capacity of about 1,452,000 sec.-ft. under maximum reservoir head, with all units functioning. (By way of comparison, this volume is equivalent to that which in one second would pass through a pipe 145 ft. in diameter at a velocity of 60 mph., or which would cover an acre to a depth of 33 ft. in one second.) To provide capacity for this volume of water, four principal classes of outlets are provided, which have, in round numbers, the following capaci-



Pinning 10-ft. widths of downstream skin plate on the ribs, with 28x135-ft. gate in raised position.



Gate section indicating size and operation

Placing a 32½-in. by 29-ft. rib girder

Ribs in place ready for skin plates

Completed gate forms a buoyant vessel

control 1,000,000 sec.-ft. flow over Grand Coulee spillway

ties: spillway, 1,000,000 sec.-ft.; river outlet conduits through the dam, 350,000 sec.-ft.; power penstocks, 82,000 sec.-ft.; and pumping plant, 20,000 sec.-ft. Provision of the type of gate best adapted to each of these classes of outlets was the principal mechanical design problem involved at Grand Coulee Dam.

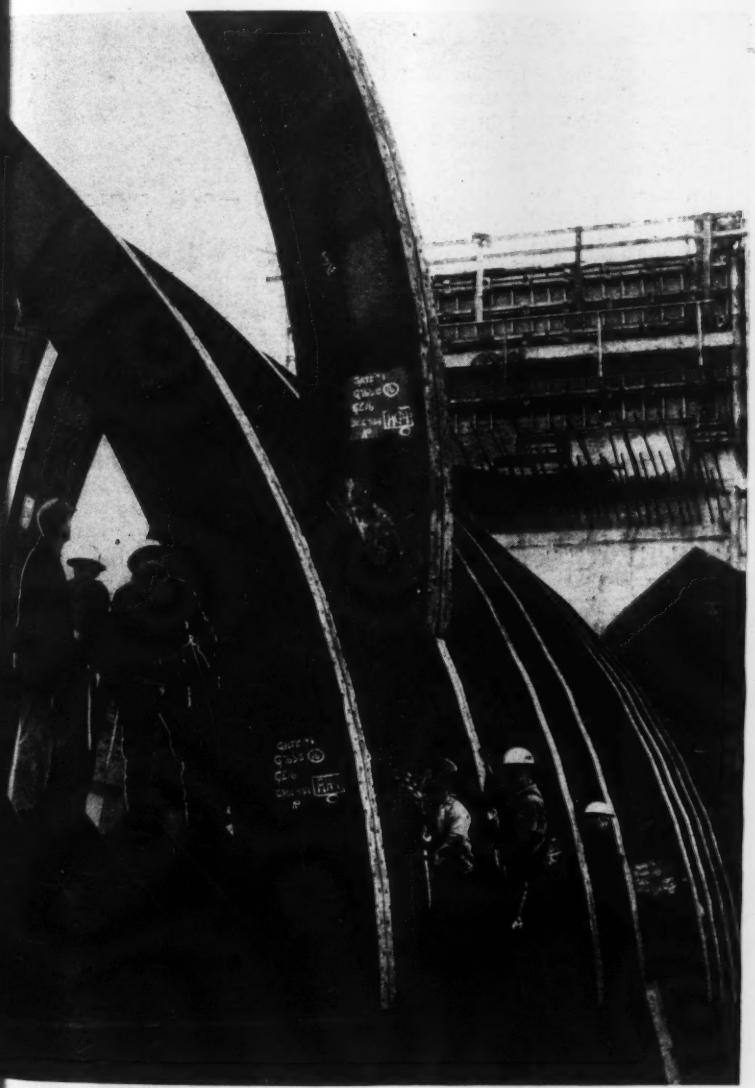
Eleven 135 x 28-ft. drum gates provide a movable spillway crest 1,485 ft. long; and when fully lowered, with the reservoir level 30 ft. above the minimum crest elevation, these gates have an outlet capacity of 1,000,000 sec.-ft. The primary purpose of the drum gates is to permit the raising of the reservoir level by any desired increment from the lowered crest elevation to a maximum of 28 ft. This 28 ft. represents an increase in storage capacity of 2,400,000 acre-ft., and a total decrease by 10,000 sec.-ft., of the flow required through the turbines to maintain their rated output. It is these factors, provision of an adequate discharge capacity, and conservation of water by adding 32 per cent to the reservoir capacity and decreasing the outflow required through the turbines by 12 per cent, that make the movable crest provided so desirable from the standpoint of flood control and water economy, as well as from the standpoint of dollars and cents economy.

In operation, the drum gates can be set to control and maintain the reservoir level at any point within their range of 28 ft. Three controls are provided. The first is an automatic control by which, if the reservoir begins to rise, a float-actuated mechanism will cause the drum gate to lower slightly, to compensate for the rise in reservoir elevation; and, as the reservoir elevation drops to the normal elevation for which the control has been set, the automatic control will cause the gate to rise and thereby maintain the reservoir at any desired level, with a variation of only a few inches. The second means of control is manual; and the third means is a motor-driven unit which has a remote electric control, so that any or all of the drum gates can be raised or lowered independently of the automatic control, or can be returned to automatic control merely by pressing a button.

Thus, engineering literally has placed under the finger of man, by the pressing of a button, a cascade of water which will dwarf in volume and height the famous Niagara Falls.

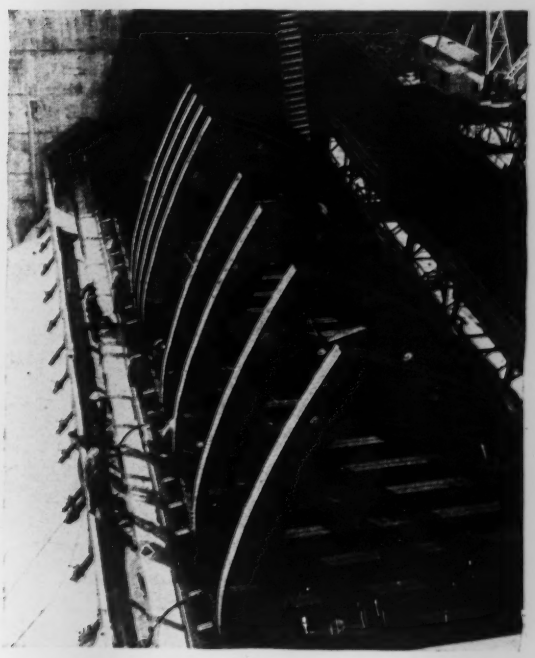
Grand Coulee Dam is being constructed by the U. S. Bureau of Reclamation which supplied this group of photographs. F. A. Banks is construction engineer in charge of the project.

Gates were furnished by the American Bridge Co. at a contract price of $609,360.



rders 26-ft. radius form the downstream side. Skin plate splices are welded watertight.

Gates provide 28-ft. spillway regulation



Mexico denies U.S. aid for defense bases

Mexico will construct naval bases and condition her ports for costal defense entirely with her own human and material resources, according to a frank statement issued by Gen. Heriberto Jara, minister of marine, in denying a recent report that Mexico has made agreements for American aid for these works.

The defense program involves work at Vera Cruz and the Laguna del Carmen, on the Gulf of Mexico coast, and Acapulco and Margarita Island in Magdalena Bay, on the Pacific. No other naval bases are to be established in Mexico, and all work of a national defense character will be performed by Mexican labor under the direction of Mexican military engineers and in accordance with federal budget allotments, states Gen. Jara.

Gen. Jara has made it clear that roads to be constructed by the Mexican government in Lower California Territory to afford a connection between La Paz, capital of the southern district of the Territory, and Margarita Island, are not to be military in any respect.

• • •

Penn. plans $3,000,000 bridge program

An expenditure of $3,000,000 for bridge construction and repairs during the next fiscal year has been approved by the Pennsylvania Department of Highways. Most of the bridges on the program for replacement or repairs are located on rural routes. There are about eight covered wooden bridges scheduled to be abolished and modern structures built in their places.

W. W. DeBerard named city engineer of Chicago

Wilford W. DeBerard, for 31 years Western Editor of *Engineering News-Record* and its predecessor, *Engineering Record*, at Chicago, resigned from his editorial duties Feb. 3 to become city engineer of Chicago. The appointment was announced by Oscar Hewitt, director of public works, who stated that Loran D. Gayton, former city engineer, would assume the office of assistant city engineer, a post that has been vacant for several years.

Wilford W. DeBerard

Mr. DeBerard was born in Fairfax, Iowa, and attended Beloit College (Wisc.) and Massachusetts Institute of Technology, graduating from the latter school in 1901. His early engineering career included three years as bacteriologist and chemist for the Denver Union Water Co., in which position he built the first laboratory for water analysis in the West; conducting filtration experiments in Philadelphia, Pa., and Oakland, Calif.; the design and construction of a filter plant at Harrisburg, Pa.; and the design of the Columbus, Ohio, water and sewage treatment plants. He was also connected with the U. S. Bureau of Reclamation and the Metropolitan Sewerage Commission of New York.

On April 1, 1910, Mr. DeBerard joined the editorial staff of *Engineering Record*, assigned to the Chicago office. He continued his editorial work without a break until his recent appointment, except for two years as consulting engineer for the Chicago Regional Plan Association in 1926-27 and a few months with the Sanitary District of Chicago as a member of the board of review considering the lake level controversy.

Outstanding in his long editorial career is a series of ten articles written after the Mississippi River flood of 192[illegible]

Defense emergency speeds Panama Canal work

Signing of the first major contract in connection with construction of the Third Locks project, at the Panama Canal, took place in the office of Lt. Col. T. B. Larkin, supervising engineer, Diablo Heights, Canal Zone, on Jan. 20.

Arriving on the Isthmus Jan. 16, the contractors are proceeding with plans to prosecute the contract vigorously on a 24-hour-a-day basis. Work will start with stripping the overburden and establishing stable construction roads before the start of the rainy season, when work in soft material will become extremely difficult. Men and equipment will arrive on the Isthmus and construction will begin early in February.

When bids were opened in Washington on Dec. 4, 1940, for excavation of the new Gatun locks structure, approach channel and appurtenant works, the joint bid of Martin Wunderlich Co. and Okes Construction Co. was low at $8,517,100. The contract involved a total of about 12,000,000 cu.yd. of excavation in the locks site, the railroad relocation, and a drainage canal, and includes grading for the railroad and other miscellaneous work.

The Third Locks project is under the supervision of Lt. Col. T. B. Larkin, supervising engineer, and Major Hans Kramer, assistant supervising engineer and construction engineer. Elmer B. Fontaine is in charge of construction in the Atlantic area which includes the New Gatun Locks. In addition to Mr. Wunderlich and Mr. Okes, contractor's representatives on the Isthmus include C. H. Palda and B. H. Stewart.

Signing of contract for Third Locks project, Panama Canal—left to right: Martin Wunderlich, Martin Wunderlich Construction Co., Col. T. B. Larkin, Corps of Engineers, and S. R. Okes of Okes Construction Co.

and covering the engineering and economic aspects of flood control for the lower Mississippi Valley. These articles were the first to suggest in print the possibility of cutoffs in the lower river as a measure of flood relief, a highly-controversial topic at the time. Again, during the 1937 flood on the Ohio and Mississippi Rivers, Mr. DeBerard covered the situation at Cairo, Ill., and the New Madrid floodway. Other notable editorial contributions include a series of articles on small city engineering, and on water filtration plant underdrains.

Mr. DeBerard has long been active in civic and engineering society affairs; he just completed a term as director of the American Society of Civil Engineers. He has served as an officer in the Chicago Engineers Club, Western Society of Engineers, American Association of Engineers, American Water Works Association, and the American Public Works Association.

He is succeeded as Western Editor of *Engineering News-Record* at Chicago by Harold W. Richardson, who was transferred from the New York office last May.

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New bridge probable at Tacoma Narrows site

Current opinions in Washington state engineering circles, even before the appearance of reports by investigating boards named by the Washington Toll Bridge Authority and the Federal Works Administration, indicate that a more substantial structure is necessary to replace the Tacoma Narrows suspension bridge, which collapsed Nov. 7, 1940. Thus the cost doubtless will exceed the insurance payment which, naturally, can be required only to cover the cost of replacement "in kind."

However, since toll receipts—while the bridge was open—far exceeded original expectations, it may not be difficult to finance the desirable reconstruction. Increasing activity at the Puget Sound Navy yard at Bremerton, causing a greatly augmented flow of traffic between that city and Tacoma, was largely responsible for the high receipts.

It is thought possible that the original piers and anchors can be used with little change, supporting a roadway probably one-third wider than the original.

If the side-span steel cannot be removed by Mar. 7 (the 120-day limit for filing claims), as now seems to be the case, these claims will doubtless be high enough to cover damage that cannot be foreseen prior to examining towers free from unbalanced strain. It is quite possible, as some have pointed out, that the cost of dismantling, repair and replacement might easily be near the cost of new construction.

Photo by Wide World

Underground telephone system for national defense

In a move that will assure additional coast-to-coast communication facilities to meet future defense needs, the Bell Telephone System has begun construction of a 1,600-mi. underground cable line from Omaha, Nebr., to Sacramento, Calif. At those points the new line will link with cable networks of the east and far west to provide the first all-cable transcontinental telephone line.

The new line is being placed underground along a carefully selected right-of-way which avoids highways. Supplementing several existing "open-wire" aerial transcontinental telephone lines, it will increase transcontinental circuits initially by about 50 per cent and will ultimately almost triple present cross-continent facilities.

Construction equipment consists of a tractor-powered ditcher, which cuts a trench 3 in. wide and 30 in. deep. (Machine is shown in upper left corner.) The ditcher is followed by a tractor-powered machine with a deep-running tooth which clears dirt away and then unreels two links of cables into the trench, as shown in the above illustration.

Work on the line is now moving forward from Omaha, Nebr., westward, while construction will soon be started eastward from Sacramento. To amplify the circuit, nearly 100 amplifier stations will be needed along the 1,600-mi. route; six of these are already under construction between Omaha and Grand Island, Nebr. Construction is being carried out by the Long Line Department of the American Telegraph Co., at an estimated cost of $20,000,000.

Encore for Ralph Budd

Conferment of the "Washington Award for 1941," one of the nation's highest engineering honors, upon Ralph Budd of Chicago, president of the Burlington Lines and transportation member of the Advisory Commission to the Council of National Defense, was announced Feb. 3 by Frank F. Fowle, chairman of the award commission, of the Western Society of Engineers.

The award goes to Mr. Budd for "vision and courageous leadership in advancing the technological frontiers of high speed railroad transportation."

This honor follows the award of the "John Fritz Medal" which was conferred on Mr. Budd at the annual meeting of the Am. Soc. of C. E. in New York, Jan. 15.

Mr. Budd is the 18th recipient of the "Washington Award", which went to Herbert Hoover first in 1919.

MEN AND JOBS

HOWARD R. MCADAMS, of Duluth, Minn., has been chosen as the first mineral valuation engineer to be appointed by the St. Louis County board in Minnesota. He will work under the county supervisor of assessments. Prior to his appointment he was serving in a supervisory capacity in the Duluth, Minn., WPA office.

C. R. CONKEY, vice president and general manager of the Fegles Construction Co., Minneapolis, Minn., has been named as zone operating officer of the War Department in charge of construction projects in the Seventh Corps area. MAJ. M. E. TOWNES is zone construction quartermaster in this area, which comprises Minnesota, the Dakotas, Iowa, Nebraska, Wyoming, Kansas, Missouri and Arkansas.

JOSH J. HALBERT, city engineer for Jackson, Miss., was appointed director of public works of the city on Jan. 13. Mr. Halbert, upon completing his engineering course at Washington and Lee University, directed engineering construction in France during the last World War. He has been in the engineering department of the city of Jackson for 20 years.

F. L. KUEBLER, resident engineer of Lucas County for the Ohio State Highway Department, has taken over similar duties for Wood County, having succeeded BERT S. HENNING, who becomes assistant engineer to MARTIN BERRY, county engineer of Wood County. H. L. HAKES, resident engineer for Ottawa County, has taken over work of resident engineer of Seneca County in addition to his present duties, succeeding G. W. FLING, who has become county engineer for Seneca County.

JEROME CLARK HUNSAKER, of Cambridge, Mass., has been given a captain's commission in the Construction Corps of the Volunteer Reserve, U. S. Navy. CULLEN HENRY WANT, Los Angeles, Calif., and JOHN DAVID REILLY, New York City, have been promoted to the grade of Commander in the Construction Corps of the Volunteer Reserve, U. S. Navy.

W. P. WHITSETT, who has served as chairman of the board of directors of the Metropolitan Water District of Southern California, since its permanent organization in 1929, has been reappointed for his seventh two-year term. Mr. Whitsett was instrumental in bringing about the construction of the Colorado River aqueduct, now nearing completion.

W. B. MCDONALD, resident engineer of the Alabama State Highway Department for the Ashville district, division 2, has been called to service in the Army. C. A. BOWLES has been appointed as his successor.

WOOLSEY FINNELL, engineer of Decatur, Ala., who formerly held a captaincy in the Alabama National Guard, has been promoted to lieut.-col. in the 151st Engineers.

ROBERT G. GLASS, formerly of New Castle, Pa., has been promoted to assistant manager of operations in the Chicago district for Carnegie-Illinois Steel Corp. For the past four years he has been assistant to the manager of this corporation. Mr. Glass was formerly with the B. & O. Ry. as assistant engineer at Baltimore, and as New Castle division engineer. He joined the Carnegie-Illinois Steel Corp. in 1912.

PAUL HANSEN, of Greeley & Hansen, engineers in Chicago, has been appointed to handle matters of public health for the Illinois Emergency Defense Council. The local council will coordinate matters of defense with the National Defense Council. STUART DUNCAN, LaSalle, Ill., representing public works and housing, has been named to serve on this council in a technical capacity.

D. A. MACIVER has been made acting county engineer and road superintendent of Peterborough County, Ont. He was formerly with Kerry & Chase, consulting engineers, of Toronto. Mr. Maciver was at one time assistant division engineer at North Bay and field engineer on construction with the Ontario department of highways.

COL. ROGER G. POWELL, U. S. Engineers, New Orleans division, has been transferred to Cleveland as division engineer in the Great Lakes division. He succeeds BRIG.-GEN. U. S. GRANT III.

ELLWOOD L. BARTZ, civilian engineer in the U. S. Engineers Office in Detroit, Mich., has been transferred to the Hawaiian Islands as a survey man.

CAPT. ERVIN GREENBAUM has received a year's leave of absence from the Michigan State Highway Department, and has reported for active duty with the War Department's Detroit Ordnance district.

M. S. ROSENGREN of the Colorado State Highway Department has resigned to take a position with the Nevada Cons. Copper Co. at Hurley, N. M.

B. M. FRENCH has applied for leave of absence from the U. S. Public Roads Administration to accept a commission as lieutenant in the Navy. Mr. French has been working on the east entrance approach road in Yellowstone Park. Operations on this project have been suspended until spring.

MAJ. DAVID E. DONLEY, civilian hydraulic Engineer in the Washington, D. C. district of the U. S. Engineers, has been ordered to a year of active duty with the U. S. Engineer Corps, and given a temporary assignment as a student at the Army Industrial College at Washington. Prior to his transfer to the U. S. Engineer Office last March, Major Donley had spent six years as hydraulic engineer in the flood control section of the TVA at Knoxville, Tenn.

LELAND H. KIMBALL, engineer of the Metropolitan Water Board, and chief engineer GEORGE C. EARL, chief engineer of the Utah Copper Co., both of Salt Lake City, have been named on a committee to study the Federal Supreme Court's recent New River case decision as it affects Utah water interests.

HAROLD J. SPADER, district state sanitary engineer at Pana, Ill., for the past two years, has been called for active service as captain in the U. S. Coast Guard Artillery, Anti-aircraft Division.

ADRIEN POULIOT, civil engineer, has been made dean of the faculty of sciences at Laval University, Quebec, and a member of the Scientific Research Bureau of the Province of Quebec.

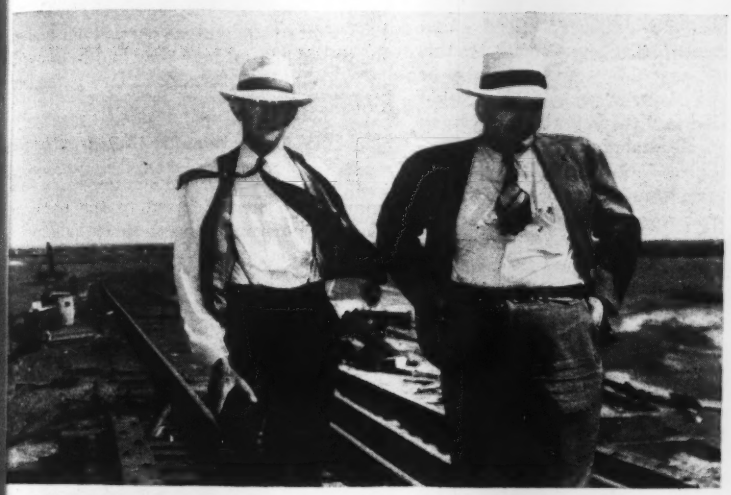
HARRY M. GEHMAN, head of the mathematics department at the University of Buffalo since 1929, has been made acting head of the new department of engineering recently created. HERBERT P. FULLERTON of the American Engineering Corp., Cleveland, Ohio, was appointed assistant professor of engineering. CARLOS E. HARRINGTON, assistant professor of mathematics and engineering since 1920, has been named on the staff of the new engineering department.

J. L. BROWN has been named vice president of United Engineers & Constructors, Inc., at Philadelphia. He has previously been associated with Lockwood Greene & Co., Charles T. Main, and Stone & Webster Engineering Corp. Mr. Brown was superintendent of construction for Dwight P. Robinson & Co., Inc., New York, leaving this organization to join the United Engineers & Constructors in 1928 as construction manager.

C. J. CRAWFORD, of Bismarck, has been named acting manager of the North Dakota state-wide planning survey by highway commissioner J. S. LAMB. He succeeds the late J. N. ROHERTY.

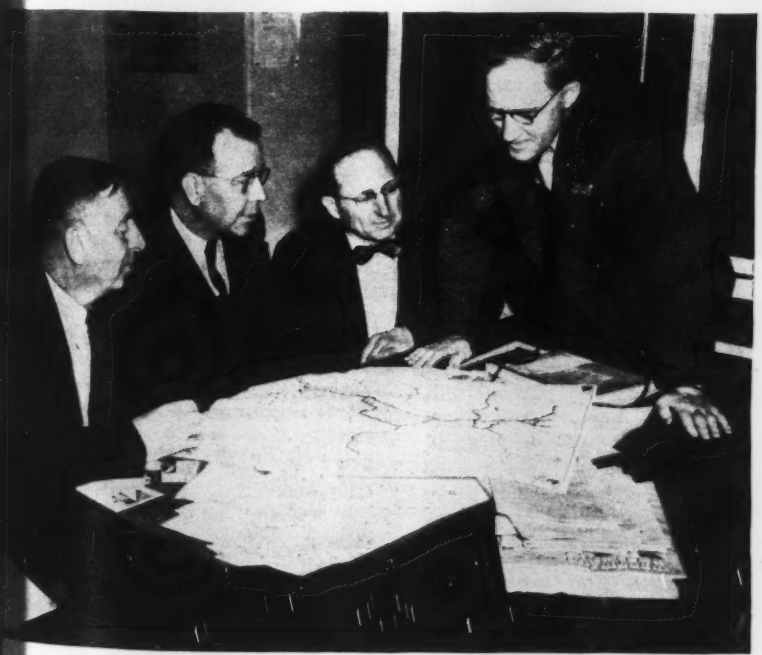
MEN AT WORK

At Hilltop Airport under construction by the city of Wheeling and Ohio County, W. Va., J. C. CAIN (left) is superintendent for Keeley Construction Co. of Clarksburg, West Virginia. J. E. HENRY (center) is representing the city as city engineer, and SIDNEY SMITH is in charge for the consultants, C. C. Smith's Sons. Three million yards of earth and rock will be moved to make three runways totaling more than 10,000 ft. in length.



An underpass job on Route 30 just west of Cheyenne is inspected by J. E. LLOYD (without coat), resident at Cheyenne for the Wyoming State Highway Department, and C. F. SEIFRIED, chief engineer of the department.

FRANK G. MERRICK (above) general foreman for S. S. Magoffin Co., on the east end of the Colorado-Big Thompson tunnel is standing 1/10 mile from the east portal and 13 mi. from the west portal, or with 12.96 miles to go to be exact. He is speed-minded, having just come from the Carlton drainage tunnel where world's records are every day diet.



Defense roads was the topic for discussion when the group at the left got together at Salt Lake recently. They are (left to right): B. J. FINCH, district engineer at Ogden, Utah for the Public Roads Administration; PRESTON G. PETERSON, member of the Utah State Road Commission; L. M. HUGGINS, senior bridge engineer with PRA at Ogden; and E. C. KNOWLTON, chief engineer of the Utah commission.

Roadbuilders meet in New York City

(Continued from p. 1)

government provided added funds to speed up the program.

Congressional thinking

The attitude of Congress toward highway problems was set forth by Hon. J. W. Robinson of Utah, a member of the roads committee of the House. Speaking for the chairman of the committee, Representative Wilburn Cartwright, who is ill, Representative Robinson sees no immediate need to build many strategic highways at this time other than those needed to give access to the training camps and war industries. Money for these roads, he said, probably will have to be supplied by the federal government. Second on his list are tactical roads needed for maneuvers, and then interregional superhighways. City access roads also are important, he said, but the question of how to obtain the right-of-way is still a difficult one despite the growing liberality of courts with respect to taking land for such purposes.

Thomas H. MacDonald, chief of the Public Roads Administration, was another guest speaker who was ill. He was represented by H. E. Hilts, director of the highway planning survey of the PRA. Mr. Hilts reported that the number of military reservations needing access roads now stands at 206, also that the PRA had mapped the areas around 150 reservations to study their road needs. This progress was made possible by the fact that the surveys had been begun in the fall of 1939. Still earlier the PRA made a study of traffic moving to and from military reservations to serve as a guide in an emergency such as the present one.

More federal aid

In resolutions adopted at the closing session, Congress was asked to provide funds to build access roads to military camps without the normal federal-aid limitations, also for funds to repair damage due to military maneuvers. Extension of federal aid to the building of streets in cities to give access to roads of the secondary systems also was urged.

Prompt appropriation of the regular federal-aid funds was asked, together with additional appropriations for greater federal participation in elimination of bottlenecks in the strategic highway network.

The A.R.B.A. again went on record as opposed to the diversion of gasoline taxes and motor vehicle taxes from highway purposes. It reaffirmed its endorsement of the contract system for highway work, and urged its use on airport construction. For construction of civil airports, the A.R.B.A. recommended to Congress the appropriation of $125,000,000 annually, this to be in addition to the $40,000,000 already provided. State legislatures were urged to adopt airport zoning laws and military authorities were asked to cooperate with municipal authorities so that military needs can be met without curtailment of civilian flying.

More airports needed

Two well attended sessions of the technical airport conference sponsored by the airport division of the A.R.B.A. and associated agencies developed the unofficial theme that "airplanes without airports are like trains without tracks." Speakers emphasized the need for civil airport construction as essential to the operation of the military air force now being built for the Army and Navy.

Col. Donald H. Connolly, administrator, CAA, reviewed progress on the current airport improvement program made possible by the $40,000,000 appropriation. He stated that a survey made by the CAA indicated a $500,000,000 program is needed to create an effective and integrated civil airport system in this country and that this would normally be considered a six-year program but might be condensed to three years in the present emergency. He stated that another $30,000,000 appropriation is in the present budget for continuing this program. The present work was described as designed to improve existing airports, sponsored by either the Army or Navy, rather than a plan to build new fields. All of the $40,000,000 will be allocated or under contract by Feb. 15, according to Col. Connolly.

Maj. McMullen, chief, airport section, CAA, indicated that existing civil airport development is so inadequate as to find the nation completely unprepared for the effective use of the air force now being planned by the Army.

Air and highway transport

The need for close integration between air and highway transport if the air transport patron is to get the maximum benefit from the speed possibilities of both the motor car and the airplane was the subject of a talk by H. H. Houk, resident engineer for the CAA on the Washington, D. C. National Airport. "Time in minutes is the true measure of accessibility of an airport," said Mr. Houk, "and this does not depend on the land travel distance alone but on land traffic conditions." It is important, therefore, that airports be served by high-speed routes. Mr. Houk is concerned lest short-sighted economies lead airport builders into the same mistake that handicapped early highway builders, failure to build facilities that will stand up under increasing demands and heavier loads. Here the experience of highway engineers can be an invaluable asset to the airport builder, not only in knowledge of how to make dollars go farther in grading and in building runways but also in avoiding losses resulting from repetition of extensive studies made by highway engineers in determining the best types of surfacing materials.

Elevated highways

The committee on elevated highways limited its report to the presentation of a paper by Ralph R. Leffler, chief structural engineer, Sanitary District of Chicago, on superhighways in metropolitan regions. Mr. Leffler favors using elevated roadways for such purposes, carrying them into the central business districts above existing streets, with direct connections to parking garages in the lower stories of office buildings.

Pavement design

Technical sessions opened with a paper by A. T. Goldbeck, engineer-director of the National Crushed Stone Assn., on the design of non-rigid pavements for highways and airport runways. Mr. Goldbeck told of the studies carried out under his direction and how they had been used in developing formulas for pavement thickness.

Embankment building

Initial reports of the committee on soil compaction were limited to the application of moisture control to embankment construction and to types of equipment used in such work. V. J. Brown, publishing director of *Roads and Streets*, in reporting on the data being collected by the committee, stated that 30 states now are using moisture control in embankment construction. He noted that few states now use the Proctor needle in soil work because of the unreliability of results obtained. One of several methods for direct measurement of density is preferred.

Frank Nikirk, civil engineer, Caterpillar Tractor Co., in reporting the committee's study of equipment, observed that too close specification of moisture content may add materially to the cost in arid regions. By proper use of equipment, he said, the desired density can be obtained with less moisture.

Progress in the three major methods of stabilizing soils for highway surfaces and bases were reviewed by Fred Burggraf of the Highway Research Board staff. Mr. Burggraf noted that all three —chemical, bituminous and cement stabilized soils—have some weaknesses, chiefly scaling or softening due to improper curing, and pointed to these defects as calling for further research.

Pavement Joints

The committee on pavement joints, J. W. Cushing, Michigan Highway Department, chairman, reported on its activities in the short time since it was

organized, chiefly outlines of needed research work.

Field investigations to determine the cause of pumping at pavement joints were described in an illustrated talk by John W. Poulter, research engineer, Koehring Co. From the investigations Mr. Poulter concluded that the accumulation of water in the subgrade under pavement joints cannot be entirely avoided, hence he recommends the use of material in the subgrade that will not be easily eroded by the movement of water from under the slab caused by the impact of vehicles. In discussion, H. H. Houk said that it appeared to him to be more a matter of adequate drainage of the subgrade and shoulders than of type of material under the joint.

Safer intersections

Leslie Williams of the Yale Bureau of Street Traffic Research, using pictures of models and actual intersections, demonstrated how channelization is used to cut down accidents at intersections. Channelization, said Mr. Williams, can be used extensively in cities where rates of travel are relatively slow, can be used less extensively in suburban areas, and must be used with extreme caution on rural highways where speeds are high.

Maxwell Halsey, Yale Bureau of Traffic Research, urged that as much attention be paid to causes of delay as is now given to collecting accident statistics, maintaining that if the causes for delay are eliminated accidents will be reduced. He also pointed to the fact that the capacity of our highways can be materially increased by eliminating causes of delay. Velocity of traffic is what counts, he said; the public is not satisfied by high capacity that only moves at a snail's pace.

Like views were expressed by Bernard C. Hartung, Nevada Highway Department, who urged that greater attention be paid to speeding up movements on our present system as one way in which they can be made of more value as defense highways.

Howard F. Ilgner, chairman of traffic committee, Milwaukee Safety Commission, who addressed the municipal officials clinic, called the pedestrian "the forgotten man" in the exercise of traffic control. Traffic signal devices now in use, said he, add nothing to pedestrian safety because they are operated primarily to expedite the movement of cars. Addition of "walk signals" to the customary red and green lights now employed was recommended.

One aid to better control and safety in the use of city streets is channelization of traffic into lanes, said Mr. Ilgner. Experiences at Milwaukee have shown that this scheme, plus the installation of safety islands in the center of streets, minimize pedestrian hazards.

The municipal officials also learned how New York City handles its snow and ice removal problems, making wide use of mechanical equipment. Details of organization and equipment operation were described by L. E. Kurtz, director of motor equipment and maintenance, department of sanitation, New York City.

Acme Photo

Officials discuss city-access roads with New York's mayor

Charles M. Upham, engineer-director, American Road Builders Assn., and Mayor La Guardia of New York (left) discuss the importance of city-access roads at the opening of the A.R.B.A. annual meeting, while Hal G. Sours, president, listens in.

Contractor clinics

Working for better health of the construction industry, the construction men of city and state departments, contractors, manufacturers and other interested members discussed the ills of the patient briefly at two sessions of the convention and outlined the fundamentals of treatments for improving the general welfare of those who build the roads.

E. E. Duffy of Michigan asked the cooperation of contractors in the A.R.B.A. campaign against road-fund diversion, pointing out the most effective methods to use and the mutual values to be gained.

Speaking on reduction of cost of compensation, W. H. Seymour of the Liberty Mutual Insurance Co. recommended planned moderate, but steady, speeds of equipment and construction as an accident preventative and a real factor in reducing all costs. As a large percentage of construction accidents involve vehicles, it is possible to analyze in advance of operation where accidents might occur and avoid them by eliminating crossovers and exposure at the loading and backing points.

Summing up current federal laws and regulations affecting the contractor, Francis J. Kelly, general counsel of the A.R.B.A., stated that it is probable that highway work will be classified as interstate and thus under federal supervision and labor regulation, but the A.R.B.A. would like to have a well defined case tried to clarify this status. He recommended that contractors require certification by the National Labor Relations Board of any union claiming jurisdiction before discussing any labor agreement.

The adverse effect on road contractors of the merit rating system of unemployment compensation rates was discussed by Clemens J. France, chairman of the state unemployment compensation board of Rhode Island. He stated that experience rating will be in effect in 40 states in two years and recommended some modification to offset the adverse effect of seasonal and short time employment which does not permit moving of employees between jobs even in the same state.

Rentals for equipment

The Associated Equipment Distributors appeared for the first time on an A.R.B.A. program when Eldon M. Farnum of the Geo. F. Smith Co., St. Louis, presented a paper on "Depreciation and Rental Schedules for Equipment." Farnum stated that in general too much of maintenance and operation expense is added into depreciation and that he believes 40 percent depreciation the first year and straight line depreciation after that for the useful life is an equitable arrangement. Rental rates must be based on equipment in first class operating condition, and according to Mr. Farnum, the distributor who makes equipment his business, not the contractor who rents as a necessity, is the one who has the

proper cost information and is in position to set the rate.

H. C. Whitehurst, director of highways of the District of Columbia, described maintenance of the pavement in Washington under a contract system which has been in use 12 years and has reduced the overall maintenance cost 10 percent despite a one-third increase in street area. Despite contrary predictions, contractors like the maintenance work and give it full attention as it keeps their plant running during construction lulls.

Construction equipment forum

Real interest in construction equipment was evidence by a well attended forum where illustrated talks told the story of new developments. A paper prepared by V. L. Glover, Illinois Department of Public Works and Buildings, telling of the advantages and limitations of vibrators was read by A. A. Anderson, Public Roads Administration. Mr. Glover declared that the pavement slab should be vibrated as an entire unit to prevent planes of cleavage and that a 1-in. slump is about the smallest slump practical with the present vibrators available. In discussion of Mr. Glover's paper, it was made known that a large saving of material is possible and that by the use of vibrators a good concrete can be obtained with coarse aggregate totaling 44 percent.

W. C. Ross, Arkansas State Highway Department, in a paper, "Observations of Vibrated Concrete Paving," which was read by H. F. Clemmer of Washington, D. C., chairman of the meeting, gave test data on actual comparison between vibrated and non-vibrated concrete from the same batch. The vibrated material was a very much stronger concrete.

J. H. Heltzel, Heltzel Steel Form and Iron Co., explained the important limitations of vibration as he saw it was danger of dislocation of reinforcing steel, form walls, and joint connections.

That vibrators must be designed to operate at today's rapid production rate, sometimes as high as 215 cu.yd. per hour, is an important factor in the design of a good vibrator for concrete paving is the belief of J. F. Swarthout, Electric Tamper and Equipment Co., who believes that keeping the roll ahead of the screed in the plastic state is very valuable.

There are many problems in vibrating highway concrete is the belief of H. K. Davis, Iowa State Highway Department. These problems include: getting a concrete of equal denseness from top to bottom, good compaction at edges of slab, vibration without causing concrete to flow over the edge of forms, and prevention of overload of finishing machines.

R. W. Baily, Baily Vibrator Co., considers the reduced cement content possible with vibrators an important factor in the use of vibrators. He stated that the Penn Turnpike could have been built $250,000 cheaper by using Iowa specifications, which are favorable to the use of vibrators.

In the discussion of the "Use of Mechanical Spreaders in Placing Pavement Concrete," A. H. Levison, Blaw-Knox Co., mentioned that the rapid work seen necessary in the defense program is going to require new skill in concrete paving. He believes the primary aim of the manufacturer is to meet the requirements of all states.

Lion Gardiner, Jaeger Machine Co., stated that in general the value of a spreader becomes greater as larger mixers are used and wider pavement laid at one pass.

J. W. Kushing, Michigan State Highway Department, considers coordination of various pieces of equipment as of the greatest importance for the maximum saving.

Walter Muller, Ransome Concrete Machinery Co., Dave Kennedy, Foote Co., and George Dimond, Koehring Co., discussed the mixer and paver problems, pointing out the wide variation in specifications, especially mixing time, which prevail throughout the country. The fact was brought out that mixing time requirements are a determining factor in economical paver size selection, as a small paver on short mix time may be able to keep ahead of the finishing equipment which on long mix time might keep up with a 34 E double drum paver. Since adjacent states and other contracting agencies specify mixing time varying from 50 sec. to more than 2 min., equipment economical on one job may not be advantageous on a nearby one.

Although not advocating pumping concrete for the usual highway job, C. F. Ball, Chain Belt Co., by the use of movies illustrated paving of an elevated highway and several other jobs where pumping was of decided advantage.

County highway officials

County highway officials opened the discussion of their problems with a talk by Perry A. Fellows, chief engineer, Work Projects Administration, on local roads in the national defense program. Mr. Fellows said that, although WPA had been directed by Congress to devote a large part of its activities to national defense with the 25 percent sponsor's share requirement to be dropped in some cases, there is no plan to turn all strategic highway work over to the WPA.

Otto S. Hess, engineer-manager, Kenty County (Mich.) Road Commission, reported on activities of the organization committee of the county group. Highlights of this report were: Highway work cannot be centralized successfully beyond a certain point, county engineers may benefit greatly by organizing and obtaining a centralized clearing house. There is a need for state groups to aid county bodies in obtaining a Congressional appropriation, and state-wide planning surveys often are very valuable.

Highway education

What engineering schools should teach young men who propose to take up highway work was the subject of an all-day meeting of the highway division. At the opening session Prof. A. Diefendorf, University of Utah, president of the division, outlined the division's plans for scholarships that will permit four highway engineers from Latin American countries to study highway engineering in this country. These plans were approved by the association at its closing business session.

E. T. Gawkins, assistant commissioner of highways, New York, expressed the view that training in basic principles of engineering is more important than specialization. He noted with approval the current trends toward teaching transportation engineering rather than railroad engineering or highway engineering.

The contractor's approach to the best training for students was set forth by J. A. Michels, editor, *Highway Builder*, Associated Pennsylvania Constructors. He would like to see students taught how to estimate and how to write specifications, and given a knowledge of contract law and the effect of social legislation on contract operations. But most important, he said, is the habit of orderly thinking.

T. Warren Allen, consultant to the Connecticut Highway Department, said that the real test of a training course is the results it produces. Specialization, he said, should come after graduation, when a man has found work that he likes; the college should lay a broad foundation.

Prof. C. B. Breed, head of the civil engineering department at Massachusetts Institute of Technology, emphasized the need for developing adaptability and the powers of observation and analysis. He would integrate practical applications with the teaching of fundamentals, but would limit it much more than is done in most schools. However, he would teach students how to do some things with their hands, such as drafting, computing and running surveying instruments so that they can be put to useful work at the start of their career. Also, he would teach them to be dollar conscious.

Public relations

Practically every aspect of public relations endeavors—from an evaluation of basic psychological attitudes to the actual methods employed in getting ideas across to people—was discussed in the session devoted to that subject.

Edward L. Bernays, Public Relations Counsel, New York City, said that the first step in planning an effective program is to establish a goal or objective

in terms of what you propose to accomplish in modifying public attitudes or actions. Then this objective should be dramatized in the form of a simple slogan. Using various channels of communication (such as the press, radio or movies) a campaign is developed to win public acceptance of the ideas promoted.

Road signs, particularly those which by simple arrows designate turns or winding road conditions, illustrate one of the most effective pictorial techniques for telling a story, said Rudolf Modley, president, Pictograph Corp., New York City. The efforts of highway commissions, in developing this technique, along with their careful studies of color visibilities and placement of these signs, represent an outstanding contribution in the field of pictorial presentation of ideas. More can be done, however, in the extension of this technique in the preparation of reports and messages which will help the public to understand the problems of the road builder and thus enlist support for improvement measures. Because of natural resistance to the reading of long, printed reports, Mr. Modley urged wider use of pictures and other graphical presentations as a means of telling a story in a quick and convincing fashion.

The role of planning

European nations now at war built up their highway systems for military purposes after making a study of American road building, according to George Farny, member of the New Jersey State Planning Commission.

Harold L. Lewis, chief engineer, Regional Plan Association of New York, said that roadside business developments might be likened in their effect on highways to barnacles on ships. To maintain speed, they must be eliminated, he asserted; since this cannot easily be done, once they have been established, the only alternative is to build parallel routes to supplement existing roads. Comprehensive planning, which incorporates such elements as control of subdivision plats, zoning restrictions, and acquisition of park strips along highways, bears an integral relation to highway construction.

Pan-American conference

The Pan-American division conference of the A.R.B.A. drew a number of outstanding speakers and visitors from all sections of the Americas and the enthusiastic attendance showed evidence of an increasing neighborly spirit. Dr. Francisco Castillo Najera, ambassador of Mexico to the U.S. stated that he was proud of the progress made on highways but dissatisfied with the many uncompleted sections. The ambassador said that the completed sections of the road are a real factor in increasing the neighborly friendliness of the Americas.

Carlos P. Anesi of Argentina told the status of 4 major routes in his country, indorsed the financing plan of the A.R.B.A. Havana conference, and asked all Pan-American organizations to get together for a bigger push for the connecting roads of the Americas.

Armando Santa Cruz, Jr. of Mexico told of the road work in Mexico pointing out that much was completed but that there still are some sections to provide an integrated system, 855 miles remaining to be paved, 400 miles of which is passable.

Manufacturers of construction machinery, linguists and technical publications are preparing a trade glossary of technical terms relating to equipment. A pamphlet is now available from *Ingenieria International* on terms relating to tractor drawn equipment. Progress on this work was reported by John Abbink of the Business Publishers International Corp.

"Pan American Highways" was the subject of an illustrated talk of E. W. James of the Public Roads Administration. He stressed the lack of passable routes between some countries of Central America even today and the effect that the Pan-American organization has had in closing such gaps.

Manufacturers division

That the highway industries should now prepare a comprehensive American highway program to start when the war ends to prevent a depression, was a plan advocated by Charles M. Upham, engineer-director, A.R.B.A., in speaking before the Manufacturers' Division Tuesday noon. Mr. Upham believes it would require between 16 and 20 billion dollars to modernize our highways in 20 years and that a 2-billion dollar yearly construction program could prevent a depression.

New officers

Hal G. Sours, director and chief engineer of the Ohio Highway Department, was reelected president for the year 1941-42; vice presidents elected are Paul B. Reinhold, John E. Ballenger, Lion Gardiner and D. A. McKinnon. H. C. Whitehurst was elected treasurer, and the following were elected directors: C. W. Brown, Frederick Hoitt, G. D. Kennedy, C. H. Purcell, E. L. Roettiger, C. J. Sherlock and Charles M. Upham. The new officers will take office at the annual meeting in May.

S. F. Beatty, Austin-Western Co., is the new president of Manufacturers Division, George Dimond, Koehring Co., the new vice-president, and H. N. Schramm, H. N. Schramm, Inc., secretary-treasurer. Wm. M. Parrish, International Harvester Co., is the retiring president.

During the convention the New Jersey Highway Department and the Department of Parks of New York City arranged inspection tours over highways of the metropolitan district. Structures to be seen on the New York tours were the subject of an illustrated talk by Sidney M. Shapiro.

Snow burning machine clears airport runways

A snow remover, which virtually burns away the snow, was put into operation at the Allegheny County Airport, Pittsburgh, Pa., Jan. 11, as shown above. The novel equipment consists of a 7 x 10-ft. wide box equipped with 6 burners fed by a mixture of crude oil and air from a 300-gal. tank truck.

On the first test the machine cleared a 10-ft. wide path of 3-in. snow, operating at a speed of 6-mi. per hour. A scraper attached to the front end of the steel box heating chamber removes deep snow and at the rear a wiper blade spreads out the water from the melted snow, thus helping the heated pavement to evaporate the water. It is estimated that an emergency landing area, 150 ft. wide and long enough to permit planes to land and take off, could be cleared with the machine in an hour.

The machine was designed by John B. Sweeney, assistant chief engineer of the Allegheny County Bureau of Maintenance.

Macdonald and Moses receive Moles award

John S. Macdonald, chief engineer of the Walsh Construction Co., and Robert Moses, park commissioner of New York City and head of the Triborough Bridge Authority were given the Moles Award of Merit for outstanding achievement in the construction field at the annual business meeting of the organization in New York on Feb. 5.

This is the first of projected annual awards of the Moles, an organization of

John S. Macdonald

men engaged in tunnel, subway and heavy construction in New York Area.

Irving V. A. Huie, commissioner of Public Works of New York City, made the presentation to Mr. Moses, given in recognition of his work on recreation areas, parkways, bridges and highways. James Erwin, president judge of Hudson County, N. J., made the presentation to Macdonald who has been engaged on more than $200,000,000 worth of heavy construction work including Philadelphia and New York subways, New York City's water tunnel from Yonkers to Queens and Brooklyn, the Queens-Midtown vehicular tunnel and the Delaware Aqueduct. Macdonald was chief engineer for Patrick McGovern, Inc., prior to 1936.

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Safety award goes to Vappi & Company

The Associated General Contractors of America has given the Shackelford award for the best record in accident prevention in the building division to Vappi & Co., Cambridge, Mass.

This honor is conferred annually by the Accident Prevention Committee of the A.G.C., and will be presented to the winner at the National A.G.C. convention in Houston, Tex., Feb. 17–20.

JOBS OF THE WEEK

MAGNESIUM REDUCTION PLANT, Permanente, Calif.
The Permanente Corp. of Oakland, Calif., will build a magnesium reduction plant of 12,000 ton annual capacity. Project also includes facilities for manufacture of magnesium castings and forgings. The work will be done by day labor. Estimated cost is $12,000,000. H. J. Kaiser is president.

MACHINE GUN PLANT, Flint, Mich.
Darin & Armstrong, Detroit, Mich., have been awarded contract for constructing a brick, steel, and concrete, machine gun plant for A. C. Spark Plug Division, General Motors Co., at Flint. Funds allotted by the War Department. Estimated cost $500,000.

ASSEMBLY PLANT, South Bend, Ind.
The Studebaker Corp. has received contract from War Department covering erection of plant and assembly of airplane engines at South Bend, Ind. Grading work at the site was awarded to W. E. O'Neill Construction Co., at a cost of $318,000. Total cost of project estimated at $20,000,000.

AIRPLANE PARTS, Fort Wayne, Ind.
War Department, Washington, D. C., has awarded contract for constructing plant to manufacture airplane parts to Studebaker Corp. Cost placed at $4,000,000.

PRECISION PARTS PLANT, Chicago, Ill.
War Department, Washington, D. C., has awarded contract for constructing plant for manufacture of precision parts for airplanes, to Studebaker Corp., South Bend, Ind. Cost estimated at $12,000,000.

NAVAL ORDNANCE PLANT, Indianapolis, Ind.
Lukas-Harold Corp. of New York City has received contract from the War Department to erect a naval ordnance plant, including main shop building, 560 x 920 ft., machine shop, warehouses and officers' quarters. Cost is estimated at $6,000,000.

SEWAGE TREATMENT PLANT, Fort Harrison, Ind.
Leslie Colvin, Indianapolis, Ind., has been awarded the contract for constructing a sewage treatment and sewer system for the Constructing Quartermaster, at Fort Harrison. Estimated cost is $500,000. Charles Hurd of Indianapolis, Ind., is engineer on the job.

NAVAL ORDNANCE PLANT, Detroit, Mich.
The Hudson Motor Car Co., of Detroit, Mich., has been awarded a contract by the Navy Department to construct and operate a one-story, brick and steel plant for manufacture of gun posts, mounts and torpedo tubes. Cost $16,000,000.

POWER PLANT, Hartford, Conn.
Stone & Webster Engineering Corp., Boston, Mass., has contract to design and construct a power plant addition, including 45,000 kw. turbine, additional boilers, and auxiliary machinery in the South Meadows plant for Hartford Electric Light Co., Hartford, Conn. The cost is estimated at $4,000,000.

OFFICE, Newark, N. J.
George A. Fuller Co., New York, N. Y., has received contract to construct an eighteen-story office building, for Prudential Life Insurance Co., at Newark, N. J. Estimated cost is $6,000,000.

BRIDGE, Louisiana
T. L. James & Co., of Ruston, La., and Keliher Construction Co., of Dallas, Tex., were low bidders at $3,412,292 for constructing the Morganza-Floodway Bridge at Pointe Coupe, La., for the Louisiana State Highway Commission.

AIR BASE, Oklahoma City, Okla.
T. L. James & Co., Ruston, La., has been awarded contract to construct barracks, mess halls, storehouses, recreation building, boilerplant, and administration building, for U. S. Engineers, Oklahoma City, on a contract price of $1,458,828.

POWER PLANT, Miami Beach, Fla.
Florida Power & Light Co., is undertaking expansion program, including erection of boiler and generator building, storage tanks to be awarded as separate contract. Total cost of improvement estimated at $2,250,000.

PLANTS, Swissvale, Pa.
Navy Department has awarded a contract for construction of a plant, equipment and tools, to Union Switch & Signal Co., of Swissvale, Pa., at a cost of $1,243,000.

CONTINENTAL DIVIDE TUNNEL, Colorado
S. S. Magoffin Co., Inc., Englewood, Colo., was lowest bidder on excavation work for Continental Divide tunnel, Colorado-Big Thompson Project, near Estes Park, at $784,711. U. S. Bureau of Reclamation, Denver, Colo., opened bids Feb. 3.

NOTE—Additional bidding and contract news on over 800 projects large and small appear in the Construction News section beginning on page 16.

OBITUARY

CHARLES HARRY MOORE, 77, former chief engineer of the Erie Railroad, died Jan. 31 in New York. After spending some time in South America on railway survey work for the Ecuadorian Congress, he returned to America and entered the service of the Erie Railway. He later was engineer for the Chicago & Erie R. R. and the New York, Susquehanna & Western R. R. and a director of the Edgewater & Fort Lee R. R. Mr. Moore retired as chief engineer of the Erie several years ago.

FREDERICK J. DUFF, a bridge builder with the Rhodes-Manville Co. for 45 years died Feb. 1 at Elizabeth, N. J. He had retired in 1929.

ARTHUR COPE EMLEN, 58, contractor and engineer of Germantown, Pa., died Jan. 26. Mr. Emlen was associated with Harrison, Mertz & Emlen, engineering firm.

WILLIAM H. SULLIVAN, former assistant engineer on the construction of the new Welland Canal, died in St. Catherines, Ont., Jan. 21. Mr. Sullivan was educated at the Royal Military Academy of Canada, entering the service of the Canadian Dominion government shortly after graduation. In 1912 he was appointed superintending engineer of the Welland Canal, later taking up the post of assistant engineer on the construction. He retired in 1923.

L. L. CHANDLER, 27, engineer of Greensboro, Ga., died Jan. 29. He was employed with the W. S. Lee Engineering Co. at Charlotte, N. C.

J. FRED MUSER, 65, an executive in the Chester (Pa.) municipal authority, water service department, died Jan. 20. Mr. Muser formerly managed the water system at Catasauqua and the Pittsburgh Suburban Water Co. He was a graduate of Temple University.

WILL EDWIN CRANE, 83, retired civil engineer, died in Washington, D. C., Feb. 2. Mr. Crane was at one time engineer for the Chicago Milwaukee & St. Paul R. R. on bridge construction; he was also engineer on the Hell Gate Bridge at New York and chief inspector of materials for the Panama Canal works.

NORMAN ROOSEVELT MCLURE, civil engineer and vice-president of E. J. Lavino & Co., died in Philadelphia, Jan. 21. Mr. McLure was graduated from Princeton University in 1904, and after a short service as bridge inspector for the old N.Y.O.&W. R.R., was in charge of erecting the Quebec Bridge from 1905 to 1907. In 1926 he became vice-president and director of E. J. Lavino & Co.

ALEXANDER WILSON, 64, engineer, died at Pittsburgh, Pa., Jan. 16. He was formerly connected with the James Joyce Construction Co., having retired last year.

JOHN F. DREMER, 83, general contractor, died at Akron, Ohio, Jan. 21. Mr. Dremer built many of Akron's prominent buildings, but had been retired for many years.

THOMAS S. HENRY, 76, retired terminal railway construction superintendent, died Jan. 21 in Kansas City, Mo.

THOMAS ROGER WARNER, 79, veteran Chicago contractor, and president of the Warner Construction Co., died Jan. 25. He was founder of the Warner Construction Co. in 1899. During the past decade this firm has been engaged in heavy construction and built Dams 7 and 12 and Lock 11 on the Mississippi River, and the Peoria Dam on the Illinois River. The firm holds the contract for Green Mountain Dam.

CONTRACTS AND CAPITAL

ENGINEERING CONSTRUCTION awards for the week, $93,741,000, top the corresponding 1940 week by 63 percent, but are 5 percent below last week. This is the 23rd consecutive week in which current awards have exceeded their respective 1940 values.

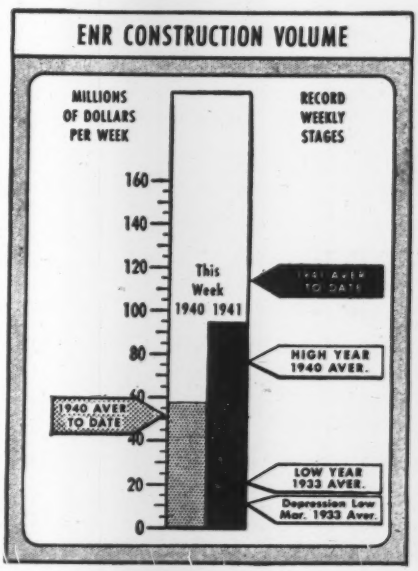
Private construction reaches the highest level reported since October 31, 1940, and for the first time since June 13, 1940, exceed the public volume. The week's private total is 120 percent above a year ago, and 26 percent above a week ago. Public construction tops the 1940 week by 29 percent, but is 24 percent below last week.

Construction volume for the year to date, $678,290,000, is 117 percent higher than in the opening 6-week period last year. Private awards are up 97 percent, and public, due to the 683 percent increase in federal work, is 128 percent above a year ago.

In the classified construction groups, industrial buildings reach the highest level reported since October, 1940, and commercial buildings and streets and roads also gain over their last week's totals. Comparisons with a year ago reveal increases in sewerage, industrial, commercial and public buildings, and unclassified.

New capital for construction purposes for the week, $7,576,000, is up 32 percent over the 1940 week. The current week's new financing is made up of $3,793,000 in state and municipal bonds, and $3,783,000 in corporate security issues.

New construction financing for the initial six weeks of 1941, $101,564,000, is 16 percent under the volume reported for the period in 1940.



CONTRACTS

(Thousands of dollars)

	Week Ending Feb. 8 1940	Jan. 30 1941	Feb. 6 1941
Federal	$8,829	$27,947	$23,462
State & Municipal	27,329	33,688	23,328
Total public	$36,158	$61,635	$46,790
Total private	21,365	37,199	46,951
TOTALS	$57,523	$98,834	$93,741
Cumulative 1941 (6 weeks)			$678,290
1940 (6 weeks)			$312,442

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1940 6 weeks	1941 6 weeks
NON-FEDERAL	$120,644	$101,564
Corp. Securities	14,830	37,065
State & Mun.	60,554	50,836
U.S.H.A. loans	45,199	12,043
R.F.C. loans	61	1,620
FEDERAL	.....	.....
TOTAL CAPITAL	$120,644	$101,564

FHA MORTGAGES

	Week Ending Feb. 3 1940	Jan. 25 1941	Feb. 1 1941
Selected for appraisal	$15,988	$20,864	$21,643*
Cumulative 1941 (5 weeks)			$95,037*
1940 (5 weeks)			$77,108

* Subject to revision.

ENR INDEX NUMBERS

Index Base=100		1913	1926
Construction Cost	Jan. '41	249.69	120.03
Building Cost	Jan. '41	207.94	112.46
Volume	Dec. '40	344	151

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York
ELSIE EAVES, Manager *SCOTT McLEOD, Statistician*
(Daily service also available—Write for details)

Location of ENR Correspondents

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply	Unclassified
Sewers, Waste Disposal	Latin America
Bridges, Grade Cross'gs	Public Buildings
Streets & Roads	Commercial Buildings
Earthwork, Waterways	Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: All low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

WATER SUPPLY

PROPOSED WORK

†Calif., Camp McQuaide—Con. Q.M., completing plans septic tank.

Calif., Sacramento—J. S. Dean, city mgr., surveys additional watermains and distr. lines to accommodate new subdivisions in city limits. Over $25,000.

Idaho, Boise—Boise Water Corp., exten. 10 in. watermain to new army air base. $45,000.

Ill., Brimfield—Voted bonds water sys. $49,000.

Ill., Cherry—Well and iron removal and zeolite softening plant. Over $15,000. Miller Eng. Service, Streator, engr.

Ind., Anderson—Bd. P. Wks., H. R. Baldwin, chn., City Hall, bids soon 1 story, 30x39 ft., brick, rein.-con., structural steel screen house, centrifugal pump, motor driven screen wash pumps, etc. $50,000. Russell B. Moore & Co., 930 Ind. Pythian Bldg., Indianapolis, engrs.

Minn., Austin—J. H. Welland, city clk., 1½ m.g. rein.-con. reservoir. $46,000. C. Jordan, Hoopeston, Ill., engr.

Minn., Glenville—H. L. Bailey, town clk., water and sanitary sewerage sys. **WPA. $143,565.**

†N. J., Cape May—4th Naval Dist. Navy Yard, Phila., Pa., removing 2 elevated water tanks and constructing 2 underground water tanks of 200,000 and 150,000 gal. capacity with service equip. $75,500. WPA. G. R. Swinton, 930 Atlantic Ave., Atlantic City, WP and owner's engr.

N. C., Wilson—W. M. Wiggins, city mgr., purchased 150 acre tract in Contentnea Creek watershed in Oldfields Twp., 15 mi. from here, and plans dam to back water in creek up for an emergency reservoir. J. D. Blount, town engr.

N. D., Fargo—C. O. Jorgenson, city aud., plans survey, WW imprvs. $90,000.

O., Columbus—Watermain extens., c.i. pipe, fittings, etc. $225,000. P. W. Maetzel, city engr.

O., Mt. Gilead—J. P. Bennett, mayor, plans purchasing local waterworks sys. from Marion Reserve Power Co. of Marion, and plans imprv. plant, installing water softener.

Pa., Allentown—7,299 lin. ft. 6, 8 and 12 in. c.i. watermains, Constitution Dr., N. 30, 26, Washington, 25, Muhlenberg, Brookdale, Chew and Madwell Sts. $77,005. E. Meckley, city engr.

Tex., Beaumont—G. W. Morgan, mayor, bids soon, rehabilitation project for WW plant and sys., filter plant exten., piping, one 1 m.g. storage reservoir, 140 ft. tower. A. C. Moore & Co., 2404 Smith-Young Tower, San Antonio, consult. engrs. R. Edmonds, city mgr. CD 12/11—ENR 12/19.

Tex., San Antonio—San Antonio Water Bd., 208 W. Market St., 8,000 lin. ft. 6- to 8-in. c.i. watermains, in Olmos Dist., installation branch water sys. in basin, force account. **$16,000.**

Wash., Waterville—Douglas Co. voted bonds two 100,000 gal. reservoirs. $26,000. CD 1/22—ENR 1/30.

Alta., Nanton—J. C. Hibert, clk., WW sys. $25,000.

Ont., Forest Hill—L. W. Archer, municipality clk., new watermain connections and WW imprvs. $15,000. N. MacNicol, 33 Lonsdale Rd., Forest Hill, engr.

Ont., Kingston—Canadian Industries, Ltd., 1135 Beaver Hall Hill, Montreal, Que., intake pipe and crib, Lake Ontario. $40,000.

Ont., Malton—Malton Water Co. Ltd., WW installation. $100,000.

Que., Disraeli—WW exten. $15,000. Div. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Que., Grenville—Auxiliary intake, on Lake Carson and imprvs. to WW sys. $20,000. Div. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Que., McMasterville—Water Supply exten. $15,000. Dpt. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Que., Napierville—Water treatment plant, minor water supply exten. $15,000. Div. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Que., St. Eustache—St. Eustache Waterworks Co., St. Eustache, plans taking over private concern and establishing own WW sys.

Que., St. Raphael—J. E. Beaudoin, town secy.-treas., bids soon, aqueduct. $35,000.

Que., St. Sabine—Watermains and domestic connections. $20,000.

Que., St. Ubald—St. Ubald Water Works Co., St. Ubald, gravity water supply sys. from Lake, 2 mi. from village, and laying intake pipe. $30,000.

Que., St. Vincent de Paul—Municipality, watermain exten., 3 and 4 in. c.i. pipe and sewer exten., 8, 10 and 13 in. vitr. clay pipe. $17,000. Div. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Que., Weeden—WW imprvs. $15,000. Div. Sanitary Eng., Dpt. Health, Quebec City, engrs.

Alaska, Anchorage—Rehabilitating water sys. $125,000. Parker & Hill, Smith Tower, Seattle, Wash., engrs.

BIDS ASKED

Bids Asked February 11

†Ill., Savanna—Con. Q.M., Savanna Ordnance Depot, drilling deep rock well.

Ia., Chariton—J. A. Olson, city clk., imprv. water plant, incl. diesel pumping unit.

Bids Asked February 12

Mass., Boston—Commonwealth of Massachusetts, Metropolitan Dist. Water Supply Comn., R. N. Molt, secy., K. R. Kennison, ch. engr., 20 Somerset St., concrete drainage pipe line in Weston, Contr. 129. Over $50,000.

†Ore., Portland—Bonneville Project, 811 N.E. Oregon St., drilling water well at Covington substation, No. 1693.

†Wash., Covington—Bonneville Project, P. O. Box 3537, Portland, Ore., drilling water well to production level of 125 g.p.m. with 10 in. casing, Inv. 1693.

Bids Asked February 18

†Md., Fort George G. Meade—Con. Q.M., Court Square Bldg., Baltimore, filtration plant addn., installing wash water pump, necessary piping, appurtenances in existing high lift pumping station; adv. ENR 2/6.

N. Y., New York—Bd. Water Supply, 349 Bway., New York, G. J. Gillespie, pres., Contr. 360, constructing 1,500 ft. diversion tunnel 30 ft. diam. and coffer-dam for steam control, excav. portion cut-off trench, construction and sinking 2 exploratory caissons for Neversink Dam, Neversink, Sullivan Co.; adv. ENR 2/6.

Bids Asked February 21

†Pa., Carlisle Barracks—Con. Q.M., pump house.

Bids Asked March 3

Wis., Niagara—O. Hildahl, village clk., exten., imprv. WW plant, watermains. $33,000. Federal Eng. Co., Central Office Bldg., Davenport, Ia., engr. CD 12/11—ENR 12/19.

Bids Asked

★**Fla., Tampa**—Exten. water sys. $2,000,000. A. Long, supt. Water, City Hall, in charge. CD 12/2—ENR 12/5.

LOW BIDDERS

†Ariz., Tucson—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., Jan. 27, 500,000 gal. elevated water storage tank, drilling water wells, from Chicago Bridge & Iron Wks., 116 New Montgomery St., San Francisco, Calif. **$61,200.** CD 1/23.

†Calif., March Field—U. S. Eng., 751 S. Figueroa St., Los Angeles, Jan. 31, water supply reservoir, pump. station, appurtenant facilities, 4½ mi. southeast of here, from A. L. Gabrielson, Arlington. **$22,131.**

†Calif., Muroc—U. S. Eng., 751 S. Figueroa St., Los Angeles, Jan. 27, water supply pump. station, etc., from Radich and Brown, 2000 Empire Ave., Burbank, **$25,276.** Est. $30,000. CD 1/23.

Calif., Oakland—Directors East Bay Municipal Utility Dist., 512-16 St., Jan. 22, installing c.i. watermains, Pleasant Hill Distributing System LS 258, from Oakland Sewer Constr. Co., 9915 Walnut St. **$27,472.** CD 1/15.

†Calif., San Bruno—Con. Q.M., Fort Mason, San Francisco, drilling, testing, two gravel-wall wells at Golden Gate National Cemetery, Inv. W-6616-41-94, from Western Well Drilling Co., 522 W. Santa Clara St., San Jose. **$27,188.** CD 1/9.

†Ga., Conley—Con. Q.M., 101 Marietta St., Atlanta, Jan. 27, 7 mi. watermains connecting Quartermaster Supply Depot, from Searcy B. Slack, 455 Clairmont Dr., Decatur. **$58,994.**

N. J., Belmar—New well and pumping station, from Thomas Proctor Co., 218 N. Fifth Ave., Long Branch. **$63,965.**

†N. J., Raritan—War Dpt., 20 St. and Constitution Ave. N.W., Wash., D. C., water supply sys., plant, pump. equip., well drilling, Raritan Arsenal, from C. W. Lauman & Co. Inc., 50 Church St., New York, N. Y. **$19,338.**

CONTRACTS AWARDED

†Fla., Homestead—Yards & Docks, Navy Dpt., Wash., D. C., sinking test wells, installing pumps, preliminary to construction pipe line to Key West, under supervision Parsons, Klapp, Brinkerhoff & Douglas, engrs., 142 Maiden Lane, New York, N. Y. Over **$15,000.**

Fla., St. Petersburg—Exten. c.i. watermains, own forces. Over **$20,000.** Funds allotted. G. V. Leland, city mgr.

†Me., Bangor—U. S. Eng., Park Square Bldg., Boston, Mass., steel water storage tank at airport, to Chicago Bridge & Iron Wks., 250 Stuart St., Boston, Mass. **$34,350.** Est. $33,800. Bids 1/24. CD 1/23.

Minn., Chatfield—N. O. Fahlgren, city clk., watermains, sewers and sewage disposal plant. **WPA.** Total cost **$246,224.** CD 1/23, under CA.

Minn., Glenville—H. L. Bailey, village clk., water and sanitary sewerage sys., **WPA.** Total cost **$216,258.** CD 1/29, under CA.

Minn., North St. Paul (br. St. Paul)—Exten., imprv. WW sys. **WPA. $38,713.**

N. J., Atlantic City—Watermains. **WPA. $69,325.** G. R. Swinton, 930 Atlantic Ave., Atlantic City, WPA and owner's engr.

N. J., Atlantic City—Imprv. water supply, removing stumps, constructing concrete retaining wall at Upper Pond Reservoir. **WPA. $214,664.** G. R. Swinton, 930 Atlantic Ave., Atlantic City, WPA and owner's engr.